Recommendations for Sampling *Halophila johnsonii* at a Project Site

The above-suggested approaches for sampling *H. johnsonii* are recommendations of the *H. johnsonii* Recovery Team.

Objective:

To outline recommended survey methods for determining the distribution and abundance of *H. johnsonii* at sites under permit review. The methods should be applicable to a broad range of project scales, from a 20-m long dock, to marinas, bridges, and channels several kilometers long.

Problem:

Three aspects make quantitative sampling for *H. johnsonii* difficult: (1) Poor visibility; it is sometimes difficult to see more than 0.1 or even 0.01 m^2 at a time. (2) Patchy and clumped distribution, with patches as small as 0.01 m^2, which may be clumped together within a sub-area of the project area. (3) Stratified distribution, with occurrence perhaps limited to a particular depth gradient within a project area.

Recommended Methods:

The most appropriate approach depends on scale, and the amount of expected error depends on the approach. Unless a complete survey of the entire area is done, the estimated distribution and abundance of this species may be significantly in error. With the exception of very small project areas, efficient field sampling may require sampling in two stages. A preliminary visual reconnaissance of the site should be conducted to locate any occurrences of *H. johnsonii.* "The importance of preliminary sampling is probably the most under emphasized principal related to field studies. There is no substitute for it." (Green 1979). Following the preliminary reconnaissance, a more comprehensive sampling, using one of the techniques outlined below, should be initiated.

In situ monitoring for *H. johnsonii* is absolutely necessary. Aerial photography may be used to map distributions of larger canopy-forming species; however, mapping of *H. johnsonii* cannot be done reliably from aerial photos. Because of significant seasonal and annual variation in distribution and abundance of *H. johnsonii*, surveys must be conducted during spring/summer (April-August) period of maximum abundance, and sampling in more than one summer is recommended. Length of time between survey date and actual start of project should consider the potentially rapid turnover and migration of *H. johnsonii.* Personnel conducting the survey should clearly demonstrate that they can distinguish between *H. johnsonii* and *H. decipiens*. Surveys labeled simply as *"Halophila"* are not sufficient.

Deliverables: 1) amount (acres or square meters) impacted, 2) estimate of percent coverage and the species present/absent, 3) site map with seagrass patch or bed locations, 4) size of the patches, and 5) shoot density estimate.

SMALL PROJECT SITES (<0.1 ha, e.g. 10 m by 100 m, such as single-family docks). Two methods.

1. Provide a site map of submerged lands adjacent to the action area. The site map should include transects approximately every 7.5 m apart, perpendicular to the shore, and for a length 6 m longer than the proposed activity. A preliminary visual reconnaissance is necessary to fill in the information between the transects. Seagrass patches should be identified by species composition and drawn on the site map. Density can be accomplished with random sub-sampling for density within the identified patches. (An overall site map is important since it identifies seagrass habitat, not just existing seagrass patches.) (Mezich 2000).

2. The site is sub-divided into m^2 grids. A complete and intensive mapping of the entire area of concern can be developed by using DGPS, with coordinates provided every m^2, or every patch >0.01-0.1 m^2, with a tested map accuracy of >50-95%. If percent cover is not used, an illustrated, standardized scale of density should be used. Presence-absence should be determined for every m^2 grid cell.

For monitoring project effects, additional information on shoot density, blade length, and flowering, can be collected from a random sub-sample of grids using 25- by 25-cm quadrats or multiple 10- by 10-cm sub-cells within the m^2 grid.

INTERMEDIATE-AREA PROJECT SITES (0.1 to 1 ha, e.g., a 100-m by 100-m marina). A two-step process is required.

a. Preliminary visual reconnaissance to locate general *H. johnsonii* areas and distribution.

b. The site should then be surveyed using transects across the dominant spatial gradient (e.g., depth, inshore-offshore, channel-shoal, etc.) of the site. The number of transects and sample intervals should adequately describe distribution and abundance of *H. johnsonii* patches. Besides noting presence-absence, x-y-z diameters of encountered patches should be noted, together with sub-samples of shoot density, blade length, and presence of flowering.

LARGE-AREA PROJECT SITES (>1 ha). Three choices are possible after preliminary visual reconnaissance.

1. Random sampling of points or quadrats within the area.

   Sampling at least 1-30% of the total area.
   - 2 stages: (1) visual reconnaissance, then stratify, (2) second intensive sampling, with intensity relative to abundance of *H. johnsonii* within the strata.
   - singe step of 100 -1,000 points/quadrats (min. # = ?).

2. Intensive survey of transects.

Transects across the entire area, sampling at least 1-30% of the total area.

- point-intersects sampling along transects (with the size of a "point" defined, e.g., 5 x 5 or 10 x10 cm).
- belt transect, of 0.1-2 m width.
- transects randomly located (min. # transects = 10-50 or min. spacing = 50 m).
- regularly-spaced transects (min. #transects = 10-50 or min. spacing = 50 m).
- quadrants at regular intervals along line (min. # = 10-50 or min. spacing = 50 m).

For any of these transect methods, x-y-z diameters of any patches encountered should be measured. At a minimum, presence-absence should be recorded at each point of each quadrat.

3. Combinations of above methods, e.g.,

   a. Intensive mapping in area of primary impact (e.g., within footprint of proposed dock), plus random points in surrounding, potentially affected area.

   b. Stratify from random point sampling, then map intensively in areas of greatest abundance.

It is the position of the Recovery Team, however, that the adoption of a valid survey protocol for identifying Johnson's seagrass be required by permitting agencies in the range of the species. In all seagrass surveys, emphasis should be placed on the identification of seagrass habitat as well as the distribution of currently existing patches. Identifying impacts to seagrass habitat, particularly from large projects, is more important in the long run than the "point-in-time" management approach of avoiding currently existing patches.

References

Green, R.H. 1979. Sampling design and statistical analysis methods environmental biologists. John. W. and Sons, Inc., New York.

Mezich, Ron (N.A.B). 2000. Personal Communication. Florida Freshwater and Wildlife Conservation Commission, Marine Resources, Tallahassee, FL.